

THE NAUTILUS.

VOL. XXV.

APRIL, 1912.

No. 12

OREOHELIX COLONIES IN COLORADO.

BY JUNIUS HENDERSON.

The native species of land snails in Colorado are mostly small—from the size of *Pyramidula cockerelli* down to *Vertigo* and *Vallonia*. The only known exception is the genus *Oreohelix*, which is much better represented, both in numbers of species and abundance of individuals, than has generally been supposed. My first experience with the genus was along the eastern foothill belt of the Rocky Mountains, the eastern limit of its range in Colorado. There I found *Oreohelix strigosa depressa* Cockerell (then considered *O. strigosa*), very generally but sparingly distributed, never obtaining more than half a dozen live or freshly dead specimens. Several facts led to the natural conclusion that the genus was approaching extinction in Colorado. (1) The scarcity of live specimens along the foothills. (2) The occurrence of large numbers of fossil specimens in a small exposure near Boulder, taken in connection with the widespread belief in a marked desiccation of the West and Southwest since middle Pleistocene time, which would make conditions less favorable for these snails. (3) Ingersoll's report (Hayden Survey, Ann. Rept., 1874, p. 396; Binney's Land Shells, p. 166) that dead *O. cooperi* were abundant in North and Middle Park, but that live ones were not common. (4) Numerous dead shells received from various localities west of the Continental Divide, with no live ones. (5) The occurrence of *O. haydeni* fossil in large numbers near Glenwood Springs, with no live or freshly dead ones reported.

More recent discoveries have rendered that view wholly untenable.

During the past five years all the species of the genus now known to inhabit Colorado have been found alive in flourishing colonies, so that it seems probable they are as abundant as they ever were.

The first important colonies to come to my attention were of *O. haydeni* Gabb and variety *gabbiana* Hemphill, discovered on the bluff above the Hotel Colorado, at Glenwood Springs, by the well-known botanist and naturalist, Professor E. Bethel, of Denver. The colonies were in close proximity, one above the other. They were on limestones, sandstones and calcareous shales. *O. haydeni* was easily recognized, but the others were sent to Dr. Pilsbry, who wrote :

“The shells are indistinguishable from *O. haydeni gabbiana* Hemphill. It is also to be noted here that Hemphill found *gabbiana* and a form with strong spirals, hardly separable from typical *haydeni*, on the same mountain-side, though in separate colonies.”

Unfortunately Professor Bethel's vivid and interesting description written at the time, was lost in transit to Dr. Pilsbry, and I have never been able to get him to attempt to rewrite it.

Later Mr. Albert Dakan, of Longmont, visited the locality and collected both species, though I am not certain that they are from exactly the same colonies. He locates his *haydeni* colony on a limestone formation “on the mountain-side on the north side of the Grand River just above the point where the Glenwood water-main crosses it.” His *gabbiana* colony he places on Blocks 51 and 52 of the town plat. His account of *gabbiana* throws such light on the habits of the genus, is so in accord with my own experience elsewhere, and so well explains why live *Oreohelix* have not been found abundantly in the State by earlier collectors, that I feel justified in quoting it somewhat fully, as follows :

“While returning from a little climb on the hill at the northeast corner of the town, on the afternoon of April 8, 1908, I noticed a few snails, and gathered what scattering ones I could find on a zig-zag course down the hill-side. I had gathered up nearly a handful, when suddenly one that was in my fingers showed signs of life. This aroused a lively interest in the search, but it was some little time before the second live one was found. After that they were easy to find. My hands were soon full, but mostly of dead ones. Not caring to discard any of them I went to the foot of the hill and got a three-pound lard pail and then went after them in earnest.

The hill-side is covered, though not thickly, with low brush and scattered bunch-grass. The earth is of disintegrated calcareous shale. Under the clumps of bushes was a sprinkling of dead leaves matted down by the winter's snows. Here were snails by the hundred. It was a populous city of slow-feet all out on parade. There had been light showers during the afternoon. The ground was very damp, but not muddy. Everywhere the snails were erect, and as the eye became accustomed to their appearance when in motion their numbers seemed to greatly increase. I soon had over a pint of live specimens—enough, it would seem to satisfy anyone that there is one place at least in Colorado where lack of numbers and difficulty of access cannot be pleaded as an excuse for not knowing more of the habits of this creature. Two days after the above find I returned to the snail city in company with Mr. Underwood, principal of the local high school. Neither he nor his instructors knew of the existence of the live snails so near town. It was about five o'clock in the afternoon. The weather had cleared up and the hill-side was comparatively dry. I had been enthusiastic in telling of the number of snails to be found, so was not a little surprised in not finding immediate verification of my story. Indeed, very few were to be found. I went from clump to clump of bushes, each time disappointed, for, where two days before there were hundreds, now none could be seen. Then I began a closer search. Snail habits were unknown to me, but their ability to hide so effectively was about the last thing thought of. We soon began to find them under sticks, roots, bunch-grass and stones, and in the small crevices of the loose earth. None of them had migrated. Under one protecting stick a dozen or more were found. Soon we had nearly a pint of shells, each full of life. It was then easy to understand why they had not been discovered. Human pedestrians do not choose drizzly days for their strolls, while such weather is the snail's delight. But in dry weather they very effectually hide themselves. It is easy to find the bleached, white, empty houses of the dead, while in life the snails are so nearly the color of the ground that they easily escape notice. In fact, it would be hard for the untrained eye to see them even when exposed to view. This I appreciated more fully after I had placed about a dozen of them on the ground near the rear wall of my home. The ground was dry and the snails were soon practically out of sight. I have been speaking of them in hundreds, but after a

more careful view will increase to thousands the numbers which may be seen under favorable conditions. Several pairs were observed in the act of copulation—in fact, this was a very common thing on this visit.”

Mr. Dakan found another colony of *gabbiana* at Newcastle, where he collected over a thousand live ones in twenty minutes. Since then I have collected all along the Grand Hogback from Newcastle to Meeker and north to Axial, up White River to Trapper's Lake and Marne Lakes, in North Park and Middle Park, and everywhere under favorable conditions have found the shells of this genus in great abundance, each species usually occupying a colony by itself, though in some instances they intermingled. While scattering ones are found elsewhere, they are abundant only on slopes or ledges of limestones or calcareous soils or shales, where there are bushes of various kinds. They are found indifferently under sage brush, wild rose bushes, mountain mahogany, *Amelanchier* and many other bushes, but are not often abundant under aspens or oaks, in this respect differing from the smaller species of snails. Loamy, willow-covered bottom-lands do not appeal to them. Where they occur in numbers they are easily found alive on moist days, when it is raining or the bushes are dripping with fog or dew. I have seldom found other snails common where *Oreohelix* are abundant.

Without attempting to enumerate all the localities from which a few specimens have been collected, I give below a summary of the more important colonies and some other records to show the general distribution of the species, the collector's name being given except where I conducted the material myself, these records being all based upon material in the University of Colorado Museum.

OREOHELIX STRIGOSA DEPRESSA Ckll.

To this form I have assigned all our Colorado material formerly considered *strigosa*. Present but not abundant usually along the eastern foothills of the Front Range from Pueblo to Belleview. The finest specimens we have are a few from an altitude of 11,000 feet on Mt. Audubon (A. Mackenzie, 1905), one very strigose specimen from near Ohio City, at 11,800 feet (Frank Rohwer). A few are from Treasury Mountain, Gunnison county, at 10,900 feet (Prof. R. D. George). The highest record is from 14 miles west of Leadville, at 12,700 feet (H. A. Aurand). Binney and Cockerell have

recorded it from Durango. A thriving colony was found just north of Morrison (Rohwer).

I visited this colony on September 23 with Mr. Rohwer, and find it the most remarkable yet discovered east of the Front Range. Though scattered snails were found over the whole slope above, they were abundant only under three small groups of skunk-bush (*Rhus trilobata* Nutt.), where the soil contained many fragments of limestone which had slid down from up the slope, the aggregate area of the groups covering less than 100 square feet. Under one root were 46 specimens clinging one to another in a cluster. As they average over three-fourths of an inch in major diameter, one may imagine the size of the cluster. On the under surface of a board on an area of 48 square inches, 98 were found, making almost two layers. Under a rock 5 by 6 inches were 23. Within a radius of 8 inches were 80. These were all alive. In a short time we collected 953 live ones. Though the weather had been exceedingly dry and warm for weeks, they were scarcely buried, the soil being too hard for them to burrow into had they wished to, except an inch or so of debris and leaves on the surface. In digging we found none deeper than 3 or 4 inches, none below the loose debris, mostly barely covered and many exposed, but all dormant. We carried them home in a box and the combined moisture of the mass seemed sufficient to awaken them, so that the next day they were all active and their shells moist. This may suggest the reason for clustering in this semi-arid region.

With this exception, the finest colony yet reported is one I found last August north of the river a mile below Steamboat Springs, on a steep, dry, south-facing slope of lower Mancos Cretaceous shales and limestone. Time was too limited for much collecting. At the first point of contact with the colony *O. cooperi* predominated, while less than half a mile to the west *depressa* predominated, thus: At the west 112 *depressa* and 16 *cooperi* collected; at the east 106 *cooperi* and 77 *depressa*. Hot, dry weather, live snails well concealed. A considerable proportion of both species were quite dark and many showed the color characters of *O. s. albofasciata* Hemphill, the upper dark band extending to the suture, the lower one to the umbilicus, with a white band on the periphery, but other examples showed complete gradation into the typical forms. As I have found this variation and gradation in other colonies of each of the two species, and finding none that cannot be referred to one or the other, the record

of *albofasciata* should be eliminated from the Colorado list. Not having seen Utah specimens of Hemphill's sub-species, I cannot say whether it is valid.

OREOHHELIX COOPERI (W. G. B.)

I have seen no live ones east of the Front Range, and but few dead or fossil ones, but it is exceedingly abundant on the outcrops of lower Mancos (or Niobrara and Benton) cretaceous limestones and calcareous shales, nearly everywhere I have been west of the Front Range, as well as on the Mesa Verde sandstone slopes at Rio Blanco and at Axial, probably where thin limestone bands in the sandstone furnished lime for the soil. Also found it more sparingly up White River to Trapper's Lake, 10,000, feet. Abundant dead but fresh shells have been found on the Laramie, North Park, near Gleneyrie (Wm. Fleming). Probably a search would have revealed a strong living colony. A flourishing colony of large live ones occurs at Montrose (Bethel) and a few dead ones came from Wolcott. There are many fine colonies on the Benton and Niobrara formations in the valley of Muddy Creek, north of Kremmling, Middle Park. One of the best is about 25 miles north of Kremmling, on a dry, unmixed sage brush terrace, with no protection except the scattered and dwarfed sage a foot or two high, yet the shells are about of normal size. On a south-facing, brush-covered slope of calcareous shales, on the north side of the creek where the wagon road from Kremmling to Steamboat Springs crosses the southwest corner of North Park, on a moist morning last July I collected 511 active specimens in a short time on a distance of 72 feet along the trail, without including the numerous young ones and only taking those easily seen without searching. At one point there were 19 crawling about within a radius of five inches. Altitude 8,860 feet. In adjacent bottomlands, where a black loam was covered by scrub willows, there were no snails. Ten were found in an aspen grove half a mile away, including one albino. At Rio Blanco a thriving colony was found under aspens, and at Newcastle a fine lot were obtained from beneath narrow-leaved cottonwoods. At Steamboat Springs, in addition to the mixed *strigosa-cooperi* colony, I found a pure *cooperi* colony, yielding abundant very robust specimens, on the west side of the river above the town. The center of abundance was in a narrow-leaved cottonwood grove on a steep, east-facing slope,

where the soil probably receives considerable lime from the limestones further up the slope. Altitude 7,000 feet. The snails were hiding under rose, sage and other brush, but not hard to find. The colony extended over the whole slope, but individuals were scarce in the aspen and scrub-oak groves. Throughout the whole region I have not found the snails abundant on the non-calcareous formations.
(*To be concluded.*)

A REVISION OF THE ANCYLI OF SOUTH AFRICA.

BY BRYANT WALKER.

Several months ago Messrs. H. C. Burnup of Maritzburg, Natal, John Farquhar of Grahamstown, Cape Colony, and John Ponsonby and M. Connolly of London, placed in my hands for examination a large collection of the *Ancyli* of South Africa. In order that the results of the investigation might be available for immediate use elsewhere, the following summary has been prepared. A fully illustrated report with complete bibliographic references, comparative remarks, etc., is in preparation and will be published in the immediate future.

The region included in the report is bounded on the north by the Zambesi and Kunene rivers.

Genus ANCYLUS Geoffroy.

Section *Burnupia* n. sec.

Shell dextral; apex punctate, in a more or less radial pattern.

Type: *Ancylus caffer* Krauss.

I. *Ancylus caffer* Krauss.

1848. *Ancylus caffer* Krauss, Sudafr. Moll., p. 70, pl. 4, fig. 13.

1859. *Ancylus gaulus* Gould, Pr. B. S. N. H., VII, p. 40.

Type locality: (*caffer*), Pietermaritzburg, Natal.

(*gaulus*), Cape of Good Hope.

Also: Umkomaas; Imputyni stream near Maritzburg; Inkwalini stream near Maritzburg; Tongaat; and Equeefa River, Natal (Burnup).

Var. *nanus* n. v.

Shell smaller than typical *caffer*, proportionately shorter and